

**Chris Korda's "A Thin Layer of Oily Rock" presentation, La Station, Paris, October 1, 2021**

I'm now going to give you an apology, a pretty long apology. It comes in the form of a story. I'm sorry to have to give this presentation, as you can probably guess from the first slide. I've been doing this now for thirty years, and a lot of what I predicted was going to happen did in fact happen, and I'm not happy about that. That's not something that I take a lot of satisfaction in. Usually people are satisfied when they're right, or proved right, but that's not the case here. Most of what I predicted was very grim, and for an example, some of you who follow my work might know that I released an album in 1999 called *Six Billion Humans Can't Be Wrong*. It's a kind of arch joke, essentially, if you're not familiar with the history of American advertising, you might not even get it, but it was a common trope in American advertising to say, so-and-so many people bought this, and so-and-so many people can't be wrong. The implication being, you should buy it too. So six billion people can't be wrong.

Well, so anyway, fast forward to 2020, we re-released the record and somebody at the record label had the smart idea—I wish I could take credit for this, but I can't—somebody had the idea to retitle the album: cross out the six and write above it eight, because that's what happened during the intervening twenty years: the population, the human population of Earth increased by a third. That's a lot, that's a huge change. And so what that suggests is that whatever I've been doing over these thirty years, that I've been involved in—shall we say antinatalism and attempts to make people more aware of overpopulation and the environmental consequences of overpopulation—whatever I've been doing for those thirty years, hasn't worked real well. It's probably true that a lot more people know about it, but knowing about it hasn't really translated into action.

So that's what this talk is about. This talk is more from the point of view of all those other things that we tried having not worked. We tried a lot of stuff. We tried art, we tried music, we tried all kinds of things. We tried making jokes about it, and being super sarcastic and ironic. The Church of Euthanasia, which is an earlier period of my work that still exists, was very ironic, but that didn't really work that well either. So we're going to try a new tactic now in the 21st century, and that tactic is just telling people the truth. Just the truth. A person I really respect a lot [Dan Miller] once said that people like to be told the truth, even if it's not very pretty. Well, we're going to find out if that's true. So the last time I gave this talk—again, this is still the apology—the last time I gave this talk was in Berlin at a gallery called Gallery Spektrum. I didn't know this when I agreed to do it there, but they were, shall we say, hardline Marxists, probably more sympathetic to Maoism than anything else. And they were horribly offended and there was nearly a riot. So I would say, this talk, maybe I should give a trigger warning. Maybe it's like that. If this talk really upsets you, well—how to say this—it's supposed to upset you.

So no rioting please, but it is an upsetting talk. What I'm about to say is going to conflict with a lot of people's cherished notions, and especially that's true in France. So France, as I'm sure I don't have to tell you, is the cultural home of postmodernism, Baudrillard and all that, and critical theory and all that good 21st century stuff. But the problem is that a lot of what I'm going to say right now, completely conflicts with all of that. And the number one thing that I'm going to say that's really conflicting with that is, I'm going to tell you what truth is, and I'm going to tell you what reality is. And of course, according to Baudrillard and his friends, I shouldn't be allowed to do that, because there is no such thing. So there we have a problem.

Anyway. So some questions, it's actually just one question just to get started for fun. I like to kind of get a sense of who's here. So raise your hands if you know the square root of 49.

[pause]

Oh my. OK. Well, we've got work ahead of us. Just for the record, the square root of 49 is seven, seven times seven, right? Anything times itself. There's relatively few numbers and only for certain integers that the square root works out to be an integer. For most numbers, it's not an integer. It's a super important idea. If you know the square roots of things, then you can have an understanding of what exponents are, and why am I bringing this up? I'm not a math teacher, this isn't a math lecture. Why would I care whether anyone knows that? Well, the reason I care is because of exponentiation. Exponentiation is incredibly important to the human species right now because it turns out that whatever capacities we have, whatever evolution prepared us for, one of the things that it didn't prepare us for was exponential change.

But unfortunately we are experiencing it, whether we're prepared for it or not. And so it's very, very difficult for human beings, they really don't like it. Human beings like linear change, where it's like last year you got paid this [much], and this year, it's a little bit more, and everything's basically kind of the same, things are changing slowly and linearly. And so you can kind of predict what will happen. Kind of like watching when the football player kicks the ball. We can predict its trajectory very well, but that's unfortunately not how the consequences of humanity's great acceleration are going to work out. Those consequences are all going to be logarithmic and exponential, meaning they're not going to look like a nice flat, straight line. They're going to look like a brick wall. And of course there's another kind of change.

There's several kinds of changes that are really bad news for us. That's one of them, exponential change, but that's actually not the worst case. The worst case is worse than that. It's called hyperbolic change. That's like if you tried to divide by zero or something. The closer you get to dividing by zero, the closer you're getting to infinity, and that's not good. Infinity is not a thing you want. And so essentially, as you get close, you approach something like what Ray Kurzweil would've called the singularity. That's what's happening to us. We're experiencing hyperbolic change, where each year we're getting closer to an impossible, like dividing by zero. Our current plan is not working. And so the symptom of that is going to be that everything's going to go off the rails at once, just as Ray Kurzweil predicted back in the 1980s. He was mostly applying this to computer processing power, but it scales, it applies to everything. Effectively, the singularity is everything going brick wall crazy at once.

So that's the reality, and our evolutionary experience didn't prepare us for it at all. And it's very destabilizing and disturbing and people would much prefer if it weren't happening, but it is happening. So with that glum introduction let's get started.

So like I said, I'm going to tell you what truth is, and that might come as a shock. Maybe no one ever told you what truth was before, but I'm right here, and I'm going to do it. So that first line [If  $a=b$  and  $b=c$  then  $a=c$ ], if you can't get past that, we're not getting anywhere. That first line is as true as a thing can be. It can't be truer. If that weren't true, our universe couldn't exist. A lot of the stuff I'm going to say to you is going to be like that. The Pythagorean Theorem, line two, same kind of thing. If that weren't true, we'd be standing in rubble right now. This building wouldn't stand up, because perpendicularity is that important. That function right there, that's how we know things are perpendicular. It's a thing. Any architecture student would be like, duh, yeah. I mean, that's the thing, outside of certain social groups, there isn't really much challenge to these ideas. If you come from an engineering background, or a science background or anything like that, this is all going to be in the category of overstating the obvious. But for lots of people, it's a big shock. Who knew that there was some stuff that's so true?

Not to beat up Pythagoras, but the Pythagorean Theorem is so true that if you look it up in Wikipedia, there's 27 proofs, just in Wikipedia. And every one of those, you could break your teeth chewing on that proof. You've got no chance. And then there are a lot of other proofs that weren't important enough to make it into Wikipedia. But fair to say that our whole world is shaped around some of these ideas. And

they're not just our world's ideas, but these are inherent in the structure of reality. So that's the third line, fundamental constants. Okay. So e, pi, zero and one and stuff like this. Zero is so important that mathematics as we know it couldn't exist without it. And we really didn't get to the stage of having proper mathematics until the Arabs—while the Europeans were basically wallowing around in the dirt, in the 13th century—the Arabs were cultivating zero.

And they're like, yeah, your math, the Greek math is pretty good, but it's lacking something, and we need this thing, zero. So yeah, we can definitely use that. So eventually we got much better math. One of course is another incredibly important number. One is the identity of multiplication, multiplying anything by one, you get itself. That's super heavy. The other two, well, like I said, it's not a math lecture. We don't need to go into all that. But I mean, those are fundamental. Those numbers are essential to reality. And there's others that are just as important, that we discovered much later. Like for example, the weak force, the strong force and so forth. These are the things that hold atoms together. Without those forces, our universe—literally, in the sense of stuff—couldn't hold itself together.

So that leads us to the periodic table of elements. Another thing that's just unambiguous. It's not that there wasn't a period where humans were unaware of the periodic table of elements. Of course we were unaware of it. When we were in the Neolithic, we were unaware of everything I'm about to talk about, but we also didn't have phones. I'm not sure where to put the jokes here, but I mean, everything about our lives is completely different than the Neolithic. In the Neolithic we were quite close to being animals, but we no longer are. Whatever problems we have today, that's not our problem today. We're very far from being animals today. Today we're creatures of civilization. Most of us work in buildings. Some of us might even drive cars. Most of us interact with visual devices all day long, all of that's 19th century and beyond, and all that stuff depends on the periodic table.

It was through the periodic table of elements that we figured out what the properties of all the stuff that our universe is made of actually are, and how those properties interact. And again, not to make a joke out of it, but better living through chemistry. Half the stuff that you're wearing is chemistry. Increasingly people wear synthetic clothing, our lives are synthetic.

Again, we're into fundamental truth, electromagnetism, gravitation, the strong and weak interactions. These are no longer debated in serious circles. This has been well understood for more than a hundred years now. And yet it's not well known.

Okay. Evolution. I mean, again, we go back what, 200 years, and people were totally unclear on this. They were unclear on how we got here. There were a lot of competing theories, religions still played a very strong role in shaping people's views.

And so lots of people, even today in America, especially people in the south, you ask how people got here and they'll say God created us, that's how we got here, and the Earth's only six thousand years old, because that's what it says in the Bible. Well, unfortunately not really. We have enough data now, we know that's not true. Paleontology is a science. We can date things, we know how old Earth is, to within a pretty narrow percentage. For sure Earth is a bit over four billion years old. And that's just not seriously debated anymore. And we know how stuff got here, we know how life evolved, because we can trace its DNA, from the DNA of all the things that are alive today, back through the DNA of all the fossils that we've recovered, and many other methods.

So we have ways of finding out how all this stuff evolved. And it's not pretty, it's not comforting, but you are pretty similar to a chimpanzee. Actually we wish you were more similar to a bonobo, which is our second closest cousin in the giant tree of evolution. The bonobos resolve their conflicts through sexual intercourse. Unfortunately we're more like chimpanzees. Chimpanzees resolve their conflicts through warfare, which is not good news for us. Anyway, not to beat this trope up. So mathematics, okay. Mathematics is the essential repository of truth for humanity. And there they are. I apologize for the

fact that they're all men, what can you do? But you know, that's a historical thing. It's not that there are male brains or female brains or anything like that. It's just that there's been sexism throughout our whole history, and racism, and a lot of other bad stuff. Our history is pretty bumpy. But nonetheless, this is one of the bright spots, from Euclid to Turing. This is a chain of reasoning and deduction and logic and enormous creativity. And so when I say later in this presentation that we stand on the shoulders of giants, this is what I'm talking about. These are our giants, these guys. I mean, you just can't imagine how much work it was to figure all this out, so that this guy [waves mobile phone] would work. This is a minor side effect of what these guys figured out, starting with very fundamental things like calculus and algebra and all that stuff that we hated in high school, working our way right on up to Gauss's field theory. Unimaginable things, like special relativity, which defines how we can view objects in deep space.

It's been a long ride. It's taken at least a couple of thousand years, depending on where you want to start counting. But again, it hasn't been linear, it's been exponential. It's gotten super-fast over the last hundred years, and that's probably why people are so confused. We live in the world that these guys created.

So here's how it is. Again, you're going to hate some of this. Science is the only viable method for attaining truth. This is the fact. I'm going to tell you what science is. Science is simply predictive explanations of phenomena. Forget every other definition you've ever heard. That's the definition I want you to remember. It sounds too simple to be true, but that's what it is. Predictive explanations of phenomena, all the words matter, predictive, meaning the essence of science is that you have to make a prediction.

You have to say, I think that this and this and this is true. And therefore I think that the following will happen when we do blah. And then, you've made a testable assertion. Now people can say, oh you think that do you, well let's try blah. And you know what? We just tried blah and what you said, it didn't happen. Your theory is bullshit. It's a dead hypothesis. And so that's how science works, basically, is you make predictions. And it's really actually all about that, because if there are multiple explanations of a thing, generally, it doesn't matter how complicated the explanation is. In a contest between two explanations, even if the more predictive one is more complicated, it still wins, because predictiveness outweighs complexity. Sometimes the explanations have to be complicated, because reality is complicated. So predictiveness is absolutely everything here.

This is how we got to where we are, is by making accurate predictions. And of course the essence of a prediction, as I said, is that it's testable. And if it's testable, then other people can try it and they're going to try it. And so your results have to be repeatable. Your rivals will try it and they will be totally happy if you're wrong, because nobody likes it if you disrupt the prevailing dogma. Dogmatism is everywhere. Not just in other things, but in science too. It happens every now and then that somebody kicks over the apple cart, and all the scientist gets super mad and say, that can't be true, because if it's true, then that fucks up their whole thing, and they look bad, and years and years and years of research turns out to be wasted. It doesn't happen very often, but it happens.

Anyway, simplicity is also valued, but remember, it's predictiveness that really matters. And the important point, the bottom line, is that science has been so successful at explaining phenomena that nothing else even comes close. It's like this, here we go. Science versus other human endeavors. We've got science. There you go. Predictive explanations of phenomena. There it is. And then we've got non-science. Bogus explanations, we don't have to go into that, but you know what I mean: pseudoscience, religion, and new age stuff, all that. And then things that don't claim to explain phenomena at all. There's tons of wonderful human culture that's not explanations, that doesn't try to predict anything.

Poetry doesn't predict anything. It just is. Poetry is expression, it's human expression. That's fine. But as soon as you start saying, no, this is true, that's a different thing.

That's what I'm trying to sensitize everybody to, is that we've been overloading the word truth to the point where it no longer has any useful meaning. That's closely related to what one of our later topics will be, which is solipsism. I'm going to define it now so that you'll remember it later. Solipsism is the idea that reality is whatever I say. That what's true is what I think. That everyone makes their own truth. That's solipsism, that's the enemy today. That's what we're going after.

So anyway, nothing is ever proved true by the way, this is a bit of a coda, it doesn't really matter, but it's useful to know. This is more recent history. This is the 20th century. This is Karl Popper. Things are only proved false. The most predictive explanation of a phenomenon is provisionally true. Meaning it's true until we get a better explanation, and it happens a lot. If a more predictive explanation is found, we either throw away the wrong explanation, or in some cases, we discover that the previous explanation wasn't wrong, but wasn't quite good enough, and so it gets integrated. And the most famous example of that, that you will have ever heard of was Newton's physics. Newton's physics carried us for hundreds of years. They were terrific, way better than anything that came before. And they're still true on a pool table. If you're playing pool, billiards, Newton's physics are more than good enough to explain all of the interactions that you will ever see on a pool table. And many other cases, driving a car, riding a bike, Newton is fine for that, but it isn't good enough for astronomy.

It isn't good enough for the micro and macro, it's not good enough for understanding what's happening inside atoms. And it's not good enough for accelerating objects to near the speed of light and stuff like that. Like when we shoot satellites into space, Newton wouldn't quite be good enough for that. If we tried to send a guy to the moon and we only used Newton, he'd miss. [not true, sorry! -ed.] It's like that. So good thing we waited. Good thing that we tried to send a guy to the moon *after* Einstein came along and corrected the situation. He said, yes, Newton is true, but Newton is only true within a frame of reference. And there can be multiple frames of reference, and we need a larger theory that deals with that, and is predictive within that larger universe of multiple frames of reference.

So that happens too. That's fine. That's how science grows. Anyway. Now we get to the meat of the thing. Yeah, you probably haven't heard anyone say this before, but this is a little parenthetical statement here: this entire talk is how my last album got started. My last album is called *Apologize to the Future*. We'll hear some of it tonight later. It started with this talk. One song on the album basically is this talk, there's a song on the album called *A Thin Layer of Oily Rock* and it says everything that I'm saying to you tonight, but dressed up as hip hop, or rock lyrics, or something. It's a lot more fun, but it's the same ideas. I say this just because one of the lines on the album—in the song that I'm talking about—is “the moon, it's really out there.” Where did that even come from? It comes from Einstein. He actually said that, and people were super flipped out, even when he said it. I mean, he was a very advanced thinker, but this was at a very pivotal moment in human history. It was around the same time that we discovered atomic energy. A lot of people were thinking some really heavy things, and Einstein said, yeah, it's out there, *even when no one's observing it*.

Well, what he means is that it's there no matter what, it's really real. It doesn't require human beings. Human beings could disappear and the moon would still be there. Is that disturbing? It should be. That should disturb you. The second quote, supposedly attributable to Phillip K. Dick, we don't really know, but it sounds like him. You stop believing in it and it doesn't go away. Another sign that it's real. The point is that our senses are unreliable, especially at micro and macro scales. That's why we had to build all those tools. That's why we need all that stuff. That's why science didn't really progress until we had plausible technology. Galileo wouldn't have been able to make his case, if he couldn't say hey, you think I'm full of shit, look through this.

There's this telescope, you look through it, and oh! It's hard to argue with it when it's right before your eyes. But the point is that he needed a lot of technology to build that first telescope. He needed not just technology, but knowledge, mathematics, many things that took centuries to develop. So it wasn't a trivial exercise. This is why science and technology have always co-evolved and will continue to co-evolve. They need each other. Science provides the framework for further technological development. But technology crucially provides the tools that allow us to do science. We couldn't really get serious about science until we had some idea how big things are, until we could agree about how to measure things. How big is a thing? That was not until the 19th century that we got that sorted out, by the end of the 19th century, maybe we were starting to get that sorted out. Everybody takes it for granted.

Now you're like, that's a centimeter, or that's five centimeters. No, it wasn't that easy. In the 19th century, it was like this: guys on one side of the United States would make screws. They'd ship them to a factory on the other side of the United States, where they're supposed to put the screws in something, but they don't fit. Oh. Why don't they fit? Because people can't agree about how big stuff is. You said it was an inch! It is an inch! We have different ideas of what an inch is. That's the kind of problem we had to get sorted out. Anyway, tools. This leads to a general perception, right? Which is that science is counterintuitive. Much of what we intuitively believe about our reality is just flat out wrong. Not only that, but our senses are puny, they're weak.

You can't see bacteria. That's why doctors didn't wash their hands. This was well into the late 19th century. At the Charité Hospital in Berlin they were having a big conflict because the nurse's attitude was, you guys with your theories about things that are invisible, give us a break. We know why patients die. They die because God wants them to die. It's their time. We keep their rooms nice, we talk to them nicely, we give them plenty of food and water, but if God wants them to die, they're going to die. And the doctors say, no you're supposed to wash your hands! And we have this stuff here, and if you inject them with it, they won't die because of these invisible things that you can't see unless you look through my microscope.

Do you see the problem? Much of what we now know about our reality, it was totally counterintuitive. It couldn't be obtained with the ordinary senses. It wasn't obvious. It was against dogma. It was against the dogma of the church, it was against common wisdom, all of that. Science has had an explosive effect on our values. And so increasingly we live in a world that's unfamiliar, that isn't the world that we were shaped for by evolution, out there on the savannah, millions or hundreds of thousands of years ago. Anyway, we're entitled to our own opinions, but not to our own facts. We just went all through this with Trump making up facts. That's where we're at, is this idea of people making up facts. We can't have that anymore. Why? Well, you'll see why.

Let's just skip through Karl Popper. This is important too. So we're getting to scientific pragmatism, which is the real subject here. "A theory that proves itself more successful than its rivals at predicting and controlling the world is said to be nearer the truth. This is an operational notion of truth." Why do we use the word operational, what does that mean? It means that this is a way of looking at truth that actually *operates*, that gets things done. One of the big differences between scientists and engineers and most people who are outside of those worlds is that scientists and engineers are obliged to actually get stuff working. They can't just think whatever they want. They have to think in a way that conforms to what is, this thing that we're discussing now, this thing that is true, whether we believe in it or not. And that's what all the inquiry has been into, is into the properties of that thing. Inquiry is self-corrective over time, if—notice that it's italicized—if openly submitted for testing by a community of inquirers. Look at the word community. You can't make science by yourself.

People tried it in the Renaissance, and it was a pain in the ass, because each guy had to basically create all of science from nothing. Everything, I mean basic math. People had to figure out the most basic

fundamental things over and over and over again, because there weren't any books, or the books were shitty, or the books were mistranslated, or you couldn't even get them. But now we don't live in that world. Now we've had a community of inquirers, clarifying, justifying and refining proposed truths for hundreds of years. Hundreds of years, that's what it took to get all this stuff.

Anyway, on towards pragmatism. This is really important now. There's no shortage of serious problems, and our resources should be devoted to solving them. Think of that. We have so many problems. We need to get real. We need people to take the time and effort to make incremental progress towards solving these problems.

Here we go. This is my favorite part. This is the peak for me. This is just me talking now. I'm just going to read this, because I feel so strongly about it. From me to you, this is preaching, right? "There's stuff, in patterns. Patterns emerge from the stuff. Stuff emerges from the patterns. One or the other description may be more useful, depending on the goal. We differ from most stuff/patterns in an important respect: given sufficient time and effort, we can explain how stuff works with increasing accuracy. Our explanations are valuable because they allow us to correctly predict what stuff will do. Worrying about whether stuff is real wastes time that would be better spent understanding stuff. Stuff is real enough, and there's lots of it, and it's complicated and potentially lethal and moving fast, so there's no time to waste. This is the essence of pragmatism."

It's not a neutral situation that we find ourselves in here on Earth. We are running out of time. We need to get serious about solving our problems because the universe is vast, mostly empty, and totally indifferent to our fate. Just like they say on this TV show *Person of Interest*, "the universe is infinite and chaotic and cold." I couldn't put it in better. "There's never been a plan, at least until now." That's true too. We have a plan, it's just not a very good one. We need a better plan. We need to work on it. "Out there in the icy universe, there's nothing." People constantly get this wrong. They think we could just go to other planets. No. There aren't any other planets close enough. And even if you could get to them, most of them are uninhabitable.

Sorry. It's not going to work that way. People constantly underestimate the lethality of space. All these rich guys, these billionaires, they think we're going to go to Mars, we're going to make a colony there, it's going to be great. No, they're not. This is all just bragging. This is a dick thing. They have all this money, it's more impressive than having a super-yacht, you can go into space. And then everybody's like, oh, we're so impressed. But it's not serious, and the reason it's not serious is because space is so lethal. Space is filled with hard radiation. You spend any significant amount of time in space and you get cancer from the radiation. Any astronomer will tell you this. It's just a thing that people don't know, but they should know.

The universe is hostile. The rare parts of it that aren't frozen and empty are full of inconceivably hot plasma. It's hard to even describe what plasma is. Plasma is basically what the surface of the sun looks like. You wouldn't want to be anywhere near it. You really wouldn't. You would just vaporize. Exploding stars, black holes, all that good stuff. You don't want to be anywhere near it.

The images from the Hubble telescope were incredibly expensive. They cost probably a billion dollars, maybe more. I don't have an exact figure, but they were one of the most expensive undertakings humanity has ever undertaken, and they are worth the cost. We get really good return on that investment, because they show us something, they show us this [The Eagle Nebula]. That is important. You should feel a sense of awe. Most people don't, and I don't understand that, and it's my job to try to change that. That's what the universe looks like.

It's not a friendly place. It's beautiful, from a distance, from a safe place, sitting here on comfortable chairs, it's fine. It's beautiful to know that it's out there, but you can't go there. You couldn't survive there. You can only survive here. We're stuck on Earth. Yeah. Get over it. No one's coming to rescue us.

We're stuck here. No plausible hope of escape. Dead Can Dance has it totally right. "Like Prometheus we are bound, chained to this rock of a brave new world, our godforsaken lot." Yup. Just like that. We wish it were different. But if wishes were horses, beggars would ride. We have a problem with this. People don't want to believe that this is true. They want to escape from reality.

Did anybody see that movie Platoon? Long ago? It's an 80s thing. There's a scene in there where the bad sergeant, he's killed the good sergeant, and now his friends really, really hate him. And he goes in there to talk to them and they want to kill him, and he sees them smoking dope. And he says, "why y'all smoke this stuff? Y'all want to escape from reality? I don't need to escape from reality. I am reality." Well, it's a little like that. I feel like that sometimes. There isn't going to be an escape. It's disturbing. The view of science—the view of reality that science gives us—is disturbing. That's part of the plan. It's disturbing because we can't bargain with it. We can't say yeah but no, because I don't think that. No. That's not how it works. If you want to dispute any aspect of this, you actually need data. You have to actually prove it. And you have to prove it to the satisfaction of experts in all of these fields. Good luck. Get to work. You're going to need a lot of college.

Okay. It's better to just be aware of what you don't know. No one can know all of this by the way. The picture that humanity has now of reality is so complex and so detailed that no one person could even know the surface of all of it. People specialize in a particular aspect, like chemistry, or maybe just organic chemistry, but then they don't know anything about paleontology. They can't even keep up with the research in their own field. It's normal. There are some generalists, people like me who just kind of step back from the whole thing. I'm not a paleontologist. I'm not a chemist either, but I can step back from the thing, I know how to read science and I can give you an approximate look at what the picture might look like.

And what the big picture looks like is, we have a big problem. We either face the harsh reality of our situation here, or it's going to kill us. We just haven't got much time left. We haven't got time for mysticism or spirituality or—there's that word—solipsism. "Well, I don't think that's true because I think something else." No, no, no. It doesn't work like that. The bill is coming due right now. The bill for our great indulgence, the fossil carbon binge. We're going to see that in a minute. That bill, it can't be bargained with. It's real. It's up there in the atmosphere. It's absolutely measurable. It's called the Keeling Curve. We'll see that in a moment. And so there's no time left for childish indulgences. It's just like that scene in *Blade Runner*. "Wake up, time to die." Big numbers are coming to get us.

The greatest shortcoming of the human race is our inability to understand the exponential function. Yes. Albert Bartlett. What a great guy. He's dead now. He spent his whole life teaching the same class over and over and over again to college kids, trying to teach them about the exponential function. The problem of the lily pond. How many of us would get that right? The lilies are increasing. Remember, you've heard it a million times. You've probably all heard that parable. The lilies are doubling every day, the lilies are growing, they're doubling every day, and the last day, you know what happens right? On the last day, it's half full and it's counterintuitive. You think, oh, it's only half full. No, that's the last day because exponential growth works that way. Anyway, that's how we got here, is exponential growth, and it's not sustainable.

Unbounded growth—this is what the scientists will tell you—it's not physically realistic. There is no such thing. In reality, there's always a limit. Within your own body, if it occurs for a while, it's cancer, it's a big problem. Cancer is natural too.

Growth of human impact on ecosystems is *hyperbolic*, there's that word again. Our impact is accelerating so rapidly that it's approaching dividing by zero. Increasingly if you look at time lapse photographs from space of what Earth looks like, wilderness is disappearing at such an astonishing rate that most of the people in this room will live to see a completely sterilized ocean. That's just a fact. And



any honest marine biologist will tell you that. The oceans are dying right now, and we're not going to save them in time. We're going to have to make do without fish. That's a fact, for sure. We already killed off 90% of the life in the oceans. That's what the history tells us, and the last 10%, all the nations of the world are arguing over who gets to eat it the fastest. So this is a singularity. We are living through it. It's imminent. It's happening.

Part of the reason it's happening is because it's difficult to persuade a man of something if his salary depends on him not understanding it. That's early 20th century, Upton Sinclair. There's a lot of investment in keeping things this way. Well, you can understand how it happened. Here's how it happened. [shows graph of fossil fuel and human population] There you go. So you see that blue line? Remember when I said the fossil carbon binge, there it is. You can't get more blatant than that. The population explosion was a direct result of us discovering fossil carbon. You can't separate one from the other. You have total causation. Look at that. You wouldn't find a better fit anywhere. We found a bonanza. And by way, I don't blame people for that. I don't blame people for exploiting fossil carbon. It was probably the right thing to do. It's just that we can't keep doing it. It's going to have to stop now. We're going to have to figure out something else. But we're clever, we'll figure something else out. Hopefully. That's going to be your guys' job. I'm too old. But remember this graph, you won't see a better fit.

And remember this, it's not the planet that's endangered. All that bit about "save the planet, kill yourself" back in the nineties. Yeah, that was my little joke. I apologize for that too. It was a joke. It was absurdism. The reality is we couldn't kill the planet if we tried. People get this wrong all the time. It's not the planet that's in danger. We could set off all of our bombs at once, hydrogen bombs, everything. It still wouldn't kill life. Most bacteria, many insects would survive that easily, and within some number of hundreds of thousands or millions of years, there would be completely new life on this planet. Not including us. That's the reality. We can't kill the planet, but we can kill ourselves. That's much more likely, unfortunately. So we have a responsibility not to do that.

Why? Why do we have a responsibility? That's the question we ought to be asking ourselves. Many people would come up with different answers to that. That's not a scientific question, but I would answer it this way. I would say that because we can feel guilty about destroying ourselves, we shouldn't do it. I know that it sounds paradoxical, but we're the first form of life to evolve on this planet that can destroy ourselves and feel guilty about it. Lots of lifeforms have disappeared. 99% of all the species that have ever lived on Earth are no longer around, they went extinct for one reason or another, but they didn't do it voluntarily. They didn't blow themselves up. They just had bad luck. They weren't hyper-intelligent like we are, they certainly weren't capable of writing Shakespeare or anything like that. We have a heightened sense of tragedy.

Is this getting through? The point is that human beings are... The Dalai Lama would put it this way and say, look, it's all about sentience. It's all about suffering. Clearly we share suffering in common with lots of living things. This is why people don't like killing insects. Maybe some people do, but most people don't, not big ones anyway, because you kind of feel bad. You watch its little legs going like this. [makes leglike motion with fingers] And you can imagine—it's hard to imagine what an insect feels like—but it's clearly not happy. You are causing it pain. You'd like to kill it faster if you could. Right? Well that's because we recognize pain in other animals. This should be obvious. That's why we like to have cats and dogs around: because they're kind of similar to us. And unlike an insect, you can definitely empathize with a cat's emotional states. You can tell when it's bored, when it's hungry, or when it's angry, or when it's sleepy. You can tell when it's asleep. You can't tell when an insect's asleep, it's pretty difficult, but a cat, you can. This is part of the seriousness of life, is that human beings are aware of pain in a much deeper way than other animals are. We feel it, we really feel it, we feel it on a tragic level. And we have a responsibility because of that. To the extent that we have a choice, we should be responsible and do

the right thing, because we want to cause less pain. For whom? For animals? Yeah. But no, we want to cause less pain for future generations of ourselves. That's what this talk is really about after all. It's not about the present. You can read about the present in the newspaper.

It's about the future. What are we going to do? If we disappear, it won't matter. The Earth will look as if we never existed in a few hundreds of years. That's what Alan Weisman proved. He did the research and then he wrote it up in a wonderful book called *The World Without Us*. Go read *The World Without Us*. You'll see. Don't count on my word. Read *The World Without Us* and you'll see that whole bit at the end of *Planet of the Apes*, with the Statue of Liberty sticking out the sand, it won't happen like that. Most of our stuff won't last that long. It'll just disappear. There'll be a few things that hang around. Plastic will actually be one of the things that hangs around the longest, but not in any form that you would easily recognize. There'll be little tiny bits of plastic everywhere.

That's kind of how it already is now because we've got plastic in absolutely everything. That'll last for a long time, but our big stuff, our heroic buildings and monuments and so on: garbage. A few hundreds of years and it's all gone. Entropy is like that. If you want civilization to work, you have to keep rebuilding it. That's why it's so expensive. You can't just build it once and it lasts forever. We wish. No. People get tired of it. Those buildings are okay, but we want new ones. Civilization has to be constantly regenerated. That's why we need so much energy to make it.

If it doesn't go well for us, then it doesn't go well for us, but believe it, if it really starts to go down, we'll be the first thing to go. Apex predators are always the first thing to go. We depend on everything else. So it won't be squirrels that bite it. It will be us. In fact, for squirrels, life will get better. If humanity bites it, squirrels will not miss us very much. There'll be more forests. They'll be more nuts. Life will get better for squirrels. Life will get worse for cows. Maybe, kind of. And for cats and dogs and chickens and pigs. Though at least we won't be mass murdering them. There'll be less of them anyway. We have way, way, way too many cows right now, cows and corn and a few other species that we like are taking over the whole surface of the Earth. Why? Because we like to eat meat. So if humanity disappears that won't last, there'll be a lot less cows. Cows won't really care that much. They might like it better. Who's to know.

But this is all off the subject. The point is we don't want to go. We don't want to be extinct. Or do we? We should start asking ourselves this question. Do we, or don't we? We no longer have time to be lukewarm on the subject. We have to decide, because right now "We don't understand the problem; we couldn't do anything about it if we did; and we wouldn't do anything about it if we could." That's what Minoru Kyo said, and he might be right. And if that's true, then we're fucked. It's up to us to prove him wrong, this is my point, and the only hope for doing that is to become more rational. That's why I focused on rationality here. We've got to be more rational, we've got to be more cooperative and more altruistic, quickly. Drastic change within a lifetime.

Astonishing neck-snapping change. Who knew that humanity could do this? Well, we've done stuff like this before. We just need to do it quickly. To quote Winston Churchill. "The era of procrastination, of half-measures, of soothing and baffling expedients, of delays is coming to its close. In its place we are entering a period of consequences." That's the reality. We're now going to have to pay the bill. And we're going to pay it because we want to, because we want to survive.

We feel meaning. Meaning comes from us. It's not a property, it's not like the periodic table, that's actually baked into the structure of things. No, we make meaning for ourselves and we can decide what we want to build our meaningfulness around. If we build our meaningfulness around partying, then we're probably fucked. It didn't work for the Romans and it won't work for us either. We need to build our meaningfulness around something more constructive, like objective reality. That would be a good place to start.

Humans *may* be an intelligent species. Think of that. We don't know yet. We may, it's looking kind of like we are, but it's looking kind of like we're not. If we're intelligent, we'll stop burning fossil carbon. But the point is that we're the only intelligent species on Earth, and the only ones that can choose to destroy ourselves. And we can and should feel guilty for causing our own extinction, because we're capable of avoiding it.

And let's be clear. It's our rationality that makes us worth saving. We're not saving ourselves because we're cute and easy on the eyes. We're saving ourselves because we're unique on this planet. Our survival depends on the global uptake of rationality. It's a new phenomenon. Think of it! A few hundred years ago, this talk couldn't have happened. All of its subjects didn't really exist yet. It's really been changing fast, have a sense of scale here. We could prioritize long-term survival. It would be a good idea.

That's what David Grinspoon said. Everybody needs to go read David Grinspoon. Write it down on your phones. David Grinspoon, write it down, the name of his book is *Earth in Human Hands*. He's from NASA. He studied planetary biology. It sounds crazy. Exoplanet biology. You're studying the biology of other planets we haven't been to. How could that even work? Well, read his book, you'll see. It turns out we can learn a lot about other planets throughout the universe from astronomy, and the conclusion is pretty clear. The experiment we're performing with intelligence here has been performed elsewhere, a lot. And unfortunately the results usually aren't very good. Usually what happens is when a species becomes as intelligent as we are, it throws an epic party. Remember that slide where I showed you the straight line, that's the epic party. We burned all our resources at once and had a wild time, a really wild time. We built cars, planes, and cities, and we increased our population by a factor of like, what is it? A hundred? I'm not even sure, some huge, huge number. And we just took over, and took over the whole surface of the Earth and did everything at once. And it was fucking wild. The 1970s were super wild, but ever since then, there's been a kind of hangover. People are like, oh wow, that was really wild, but you know what, actually there's some problems that we didn't see coming back then. In the 1950s people thought we were all going to be riding around in rocket ships, but it didn't work out like that.

Instead things got complicated and messy. And so now we're in the stage where we either stop throwing a super wild party and burning all of Earth's resources at once—because that can't last, obviously, even people who want to do that are aware that it probably won't work—or we're going to do something else. The something else is what we're here to talk about. We're going to save—not Earth, because it's not Earth that needs saving—we're going to save ourselves, so that the cultural odyssey that we're so invested in [can continue]. All of you are invested in it. We wouldn't be here otherwise. You're in a cultural space. We're all invested in culture. Culture is wonderful. It's what makes humans human. And we want it to continue. Or do we? That's the question we're going to answer, because if the plan is to just throw a super awesome party, mostly for the rich—first world problems, it's going to be in mostly in the first world—and burn all the rest of our resources, fill the atmosphere with carbon and then go extinct, if that's the plan, then we don't need to change anything. We've already got the right system of government for that. It's called liberal democracy. Neoliberalism. It works great! Capitalism. That's what capitalism is. Capitalism maximizes that. It maximizes the party for the super-rich. Okay? Just remember that, we've got that system already. If that's really what we want, if we really want to do that and fuck the future, all good. End of talk. But if we don't want that, then we have a big problem, because we've left it until super late to turn the ship around.

It's good to be honest about this. Our aim is more than survival. It's not good enough if it turns into Mad Max. That won't do, because then there won't be any human rights. Remember? Human rights only exist because of the French revolution, governmental infrastructure that came into existence after the Napoleonic codes, and that's all really new. Before that there were no human rights. And yeah, it's somewhat uncomfortable to say it, but for most of human history, women were treated worse than animals and slavery was just a fact of life. Populations lived through constant warfare. It's become

fashionable to romanticize the pre-technological world, and especially to romanticize tribalism, but go back and read your anthropology more carefully, and you will discover that actually we live in a very enlightened time. Arguably you guys are the beneficiaries of the most peaceful time in all of recorded history. We want that, because that's what's allowed our cultural odyssey. That's what's allowed us to thrive, to make art, to make love, to write books and poetry and have concerts. All of that depends on freedoms that are very new. We want them, but we're going to have to find a way to finance it without filling the atmosphere with more CO<sub>2</sub>.

That's what we're trying to save. We're trying to save—not the Earth—we're trying to save the Earth's ecosystems for future generations, so they can fulfill our ambitions by having a more enlightened society, because ours isn't actually all that enlightened. It's a lot better than what came before, but it could be a lot more enlightened than it is. So we're really trying to save Earth for the future. That's the point.

Anyway, we're almost done, thank you for putting up with this. David Grinspoon, *Earth in Human Hands*, we already covered it, but there's a few things we didn't cover. How about Joshua Lederberg? He got a Nobel prize, by the way, this was his Nobel prize acceptance speech. "The survival of the human species is not a preordained evolutionary program." What does he mean? He means, stop acting like it's preordained, stop acting like it can't fail, because it can, and in fact, it is failing. It's failing right now. And not only that, but we're on the hook. We're responsible, because we're captains of our fate. Yes. That's one of the lines from the album too. We're captains of our fate. Is it extinction? We don't know yet.

Whether we should or shouldn't keep Earth habitable for ourselves—and non-humans, don't forget them, we need them—is a purely ethical question. There is no scientific answer. Like I said, if the plan is for us to destroy ourselves and the majority of us are down with that, science has nothing to say. Scientists might even help us. Think of that. They'll do whatever we ask them to do.

Only institutions—governments, corporations, schools, unions—have the necessary power to change human consciousness quickly enough. Think of that. We haven't got time. We need institutional change. The Church of Euthanasia is a good start. Non-procreation, veganism. You get big props from me for doing those things, but it's not enough. I'm upping the ante now. That was good enough thirty years ago, but it's not enough now. Now I need you to do more. I need you to devote your life to infiltrating and reorienting our institutions towards long-term survival, because that's what it is. Otherwise, there's just not going to be future generations. So go forth and don't multiply. Do the right thing and face reality. This is what *Apologize to the Future* is really about. Our current trajectory isn't just an injustice. No, it's an existential threat to future generations, because they're just not going to be around if we keep this up. And they can't defend themselves, because they're not here yet, or they're just little kids.

So it's critical. It's critical. There should be sirens. Think of that moment, you've all experienced this, if you've ever been hurt badly, or seen someone get hurt badly, and the police show up—they're usually the first responders, sometimes it's an ambulance—and there's a kind of uncomfortable quiet. People are standing around, they don't know what to say. And you're on the sidewalk or whatever, and there's the sound of radios. Have you ever had this nightmare, where you hear people talking on radios, they're reporting back to base. And you have this feeling of, might not make it. Might not live. That's our situation. It's critical. The radios, red one to base, the patient might not make it here. "We haven't got time for a meeting of the flat-earth society," like Barack Obama said. We have to take action now, in your lifetime, in the next year, like that. Like Greta Thunberg says, she got up there in front of the goddamn United Nations. She looked like Gollum from *The Lord of the Rings*, she was spitting into the microphone she was so upset, but she has a good reason to be upset. It's her generation that's going to get fucked. You're going to get fucked by irrationality. The triumph of the irrational—I say this over and over—is rooted in a tragic failure of education. I don't blame people for having been fucked by the

system, and not having had a decent education, or in many cases, not even having food to eat. Believe it, child malnutrition is a huge problem, but irrationality, we can do something about. People like you, you were all beneficiaries. You all definitely had a seat at the feast of life. Just by the fact that you're here, understanding this, listening to this, you guys don't have that excuse. You guys can learn the difference between rationality and irrationality, and you should. Irrationality is like alcohol: adults should be allowed to consume it, but it should be clearly labeled. It's the disguised nonsense that we've got to watch out for, that we can't have. We haven't got time for it. Anyway, I hope I've persuaded you today that civilization is worth saving, in which case, I urge you to struggle: to struggle in your own lives personally, for rationality, cooperation, and altruism because... [shows photo of Earth] Home sweet home.

[END]

So how much time have we got? Oh, we're ahead of schedule. So we've probably got time for just a couple of questions. If anyone wants to, if anyone's up for that. You don't have to either. There's no requirement. I'm not sure when they're going to drag me out of here. I think we might have another twenty minutes or something. It seems like it. So yeah. Any questions?

[question inaudible]

Good question. Wikipedia. Wikipedia is your friend. For basic scientific subjects, it's very, very good. For anything cultural, it's hopeless because that stuff's all too recent, but for stuff that's mostly settled now, it's quite good. It's a good place to start. The Church of Euthanasia website is not bad, not a bad place to start in fact, while we're at it, this is the question I should have asked: Raise your hands if you're a Church of Euthanasia member. We got any? Holy crap, not even one? In this crowd, I can't believe it. No way. Not one, damn. We got to work on that. So to be a member of the Church of Euthanasia, by the way, you have to take a lifetime vow of non-procreation. Does that get any hands up? Anybody willing to do that? Okay. You know, I said by the way that we were going to, I advertised at some point that we were going to have a mass Church of Euthanasia swearing-in on this evening. I had hoped that there would be more of you, but even if there's two of you that makes it a mass. Normally people just induct themselves into the Church, you don't need me for that, but it's more fun and more formal if I do it. Because there's a couple of things that we've got to say and stuff, a little ceremony.

I don't know if anybody remembers the Moonies. They were a cult in the eighties, I think. But they used to have mass marriages, and that caught a lot of media attention. So we can have a mass Church of Euthanasia swearing-in, where you all take a vow of non-procreation. What do you think? Yes. Okay. Yeah. Well, okay, cool. Well, we'll do that, but we should do the questions first and then we'll do it. I'll give you a couple of minutes to think about it. One thing I'll say though, is if you have any doubt, don't do it, because the Church only has one commandment, it is "Thou shalt not procreate," and if you break that, then we definitely kick you out. You will be excommunicated for sure if I ever hear about it. So don't do it if you're sort of wussy, you have to be like, yes, I've been waiting my whole life to say yes to this, that's the kind of thing we want. And it's spreading by the way, the Church of Euthanasia has arrived at meme status. It got ripped off by Supreme. Last year they put Save the Planet, Kill Yourself on one of their t-shirts. So that's how you know you're a meme, is when the Supreme clothing company rips you off. I don't know how many people saw that, but lots. Increasingly I don't actually have to do anything. It just kind of spreads itself. But I'm still doing something, because this is actually distinct from

a lot of what the Church did. A lot of what the church did was very arty and if you didn't really think about it hard, you might not understand it. Whereas here, my goal is to make things clear.

Anyway, back to your question, I think that the thing you can do that will help the most is to try and find sources about rationality and humanity's role in determining its own future. Probably the first place I'd start is with that book I recommended. Try and find a copy of David Grinspoon's book. His bibliography will point you to lots of other good sources. You don't need to know everything about climate change. I mean, it's helpful to understand the general outlines of that, but you've already got enough of that from the news. It's more trying to get some perspective on what we're doing here that I think will help people the most, to think clearly about that. What are we in fact doing? What is the purpose of all this? And of course there isn't one. We have to make one. And so that, we have input into, you, all of you assembled here, have some input into deciding what the purpose is.

Anyone else? Okay, good. Well, something to think about, oh wait, there we go on, tell me.

Could you tell us a bit about the purpose of your population counter?

Oh yeah. I didn't think anyone was going to notice it. So yeah, by the way, that's the human population counter over there, I guess people mostly guess that. So we're just shy of eight [billion]. That's probably if anything a slight underestimate, because these numbers often are, but yeah, we're going to hit eight super soon, and that's pretty heavy because it means... Well, I'm pretty old. It means the population way more than doubled in my lifetime. That's a lot, that's a big change. I remember when parking was easy. Simple stuff like that. Or when airports were mostly empty. You get this. Oh, wow. This is cool. It's an empty airport. I don't know how to explain it, but I remember a less crowded world, and it was better. It's not really all that great that we're packed in like rats. It's starting to remind me too much of—you guys probably won't know this reference—but the Calhoun experiments, performed by a frightening behaviorist who experimented on rats. His name was John Calhoun. And he did the experiment—you can look this up later in Wikipedia—he did the experiment where you see what would happen if we took a ton of rats and put them in rat heaven, where we give them unlimited food and whatever they want, and just see what happens. And what happens is—kind of like us!—the rats had a super wild party. And they ate and ate and ate, and procreated and procreated and procreated, and suddenly we're drowning in rats here. And then things went wrong in a pretty bad way. By the time it was over, there were not many rats left, and the ones that were left were very, very traumatized, and had resorted to cannibalism, or something like this. They had been through the rat holocaust, and the few survivors didn't want to talk about it. So that's an important lesson, right? The Calhoun experiments. Not that humans are rats. I'm not the biological determinist who's going to tell you that, but I'm going to say, we have rat-like properties. We are animals, we're vertebrates after all, and so we are also capable of overshoot. Not only rats.

Yes.

So do you still think that we should kill ourselves to...

Honestly, everyone got this wrong about the Church. Suicide was always optional. Always optional, from the very beginning, we made that very clear, right in our mission statement. It said the Church of

Euthanasia supports voluntary population reduction, only voluntary. So you have to volunteer for it. If you do volunteer, we're not against it or anything. But the only thing you actually have to agree to is not having kids. I took a lot of shit over that, and I understand why. It's a subject you can't talk about anymore. You can't say Save the Planet, Kill Yourself on Facebook anymore. You might think that's pretty funny, but they sent me a little message. Either you get rid Save the Planet, Kill Yourself or we're going to do with you what we did with Donald Trump. Oh yeah. They were going to de-platform my ass. So I did. I mean, it's the 21st century. There's a lot of stuff that we used to be able to say that you can't say anymore because all of our speech channels are now owned by huge corporations, and believe it, they make the rules. One of the rules is that they can make up new rules at any time.

So would you be ready to kill yourself?

You know, people often ask me that, and my answer is always the same. Basically my answer is "don't nudge." It's not polite to be pushy about it. I might, and I might not, but that's my right, and my choice. Everyone gets to decide that for themselves. I'll decide that when the time comes, but I'm certainly not against it. I'm not against people killing themselves. And like I said, you can't say that on Facebook, but that's fine. I mean, I'm from the eighties. In the eighties, you could say stuff like that. And it was okay. It was more punk. People just said whatever they thought, and people had to get over it, but today there are certain things you can't say, and that's one of them, but actually it's a perfectly plausible position.

There's lots of people who are okay with it. I mean, in many countries now it's perfectly legal, let's not forget, you can go to Switzerland and be euthanized, if that's what you want. I'm not saying that you should do that, just for the record. I am not advocating suicide, certainly not mass suicide. I'm just saying that somehow or other, humanity needs to reconcile itself with limits. And one of the ways we're going to have to do that is by not continuing to increase our population. If we really are stupid and go all the way to ten billion, I guarantee you that all of our current problems will get much worse. That, I can promise.

I have a follow-up question about the population graph. [inaudible] Do you think there's a chance that it could flatten again, without taking us into a Walking Dead type situation?

No, I don't think so. I think that there's going to be a drastic change. The question is just which drastic change. So this is the thing that people have been having trouble with. Look at what happened with COP 26, this recent huge climate conference, where they added up all the contributions that all the nations of the world are going to make towards reducing their carbon output. It doesn't even come close to keeping us even to one and a half degrees C of increased average global temperature. And so it turns out that that was all just a lie, basically. That was just a kind of stalling tactic. Oh yeah, we're going to limit it to 1.5, maybe next year, or maybe the year after that. In fact, if you add it all up, we're going to more than two, maybe three.

And so the reality that that implies—this is why Greta Thunberg is so upset, right?—the reality that that implies is so drastically different from what we've experienced, that it's going to be hard for people to get their heads around it. That was why I made *Apologize to the Future*, because I wanted to try and express to people, how people in the future would feel about the bad decisions we're making today. They're not going to be too pleased with us. They're going to look back and think of us as real jerks, because of all the stuff that we did, or mostly the stuff that we didn't do, like we could have taken action, but we didn't, and we didn't, and we didn't. Oh yeah, we'll do it next year. We'll do it next year.

But the stock market, we've got to worry about that. And meanwhile, boom. That's the reality, is that there's going to be a drastic change, and one of the forms that's going to take is retreat from coasts. Most of the world's cities are on coasts, and there's a good historical reason for that, if you stop and think about it. It's that they depend on ports, and ports have to be at the water line, that's how ports work. So that's worked for us for a century, but it's going to stop working, and so we're going to have to move all of our cities inland. That's the kind of drastic change I'm talking about. That could happen. Some of that is already happening now. In fact, you can go and Google it and you'll see. Google "managed retreat from coastline."

Just Google that and get back to me and you'll see, New York City is already working on it. They're already planning the beginnings of that. They're going to start by building walls around New York city, but that's only a temporary stopgap. Eventually... Here's the thing, imagine—this is the kind of hallucinatory effect that this has—imagine if you had friends back in the eighties, and they'd told you, there's going to be this thing called the Internet, and it's going to be like nothing anybody ever imagined. If you had acted on that, and made certain investments, you would be very, very well off now. Because you would have had foreknowledge that other people didn't have. It's going to be like that. I'm giving you some foreknowledge, if you're investment-minded: the high ground in coastal cities is going to become insanely valuable, because there isn't going to be much of it.

Think of that, right? Some cities are flatter than others, but every city has some high ground and it's going to become more valuable. That's the kind of thing that people just don't think of. They think it can't happen, but no, it is happening. Cities are already preparing for it. So there's going to be drastic change, the question is just, are we going to survive it? That's how I would answer your question. Are we going to get through this drastic change? One way or another, the population curve is ultimately going to be reversed. One way or another, the Keeling curve is ultimately going to be reversed. Go look up the Keeling curve. The Keeling curve is the measurement, every year, of the amount of CO<sub>2</sub> in the atmosphere. It's forming an exponential curve, just like that population curve I showed you. Not quite as brick-wall, but pretty close, pretty much they track together.

And so, yeah, no matter what we do every year, we talk and we talk and we talk and we have all these conferences and the UN says this, and the UN says that, but the bottom line is the Keeling curve is still going up. That will not last. If necessary, that will end when humanity disappears, but that's a really extreme solution. You understand? That's something we have some input into. But it will end, for sure. There's an amount of CO<sub>2</sub> you could put in the atmosphere that would bake the surface of the planet, like Venus. We're not going to do that. We won't get that far. We're not going to have twenty billion people on Earth. We wouldn't get that far. We would go down in flames long before that, but it doesn't have to end that way. We can have a different type of drastic change, where we reverse it under more controlled circumstances, and that's what the scientists, and many of the people in the environmental movement are urging us to do. They're urging us to make drastic changes in our own lives. Stuff like—not just changing light bulbs—stuff like using no fossil carbon at all. Hard to do, but possible. Unlike continuing to output CO<sub>2</sub> until the surface of the Earth is uninhabitable for mammals. That's not doable. We won't survive that. So all I'm saying is, it's a choice now that we're facing. We're going to live through a very unpleasant, difficult period, and we're either going to survive it, or we won't, and the determining factor is going to be the extent to which we can make plans that are grounded in reality.